

WHAT IS CLAIMED IS:

1. A scale device comprising:

a scale member having position signals provided thereon;

a case member having the scale member housed therein and a guide opening formed therein;

a pair of seal lip members formed from a flexible sheet material and installed for end portions thereof to be in elastic contact with each other along opposite walls of the guide opening in the case member, thus closing the guide opening along the full length;

a detector unit disposed inside the case member oppositely to the surface, carrying the position signals, of the case member and which detects the position signals;

a carrier unit which slides relative to the case member as a moving part of a machine on which the scale device is to be used move;

a coupling member penetrated through the guide opening in the case member to provide a coupling between the detector unit and carrier unit and which moves sliding in the guide opening while spreading out the pair of seal lip members as the case member and carrier unit slide relative to each other; and

a pair of seal lip pressing means provided on the carrier unit at opposite sides, respectively, of the seal lip members and opposite ends, respectively, of the coupling member to press the outer lateral sides of the seal lip members between

them, thereby keeping the guide opening closed.

2. The scale device as set forth in claim 1, wherein the seal lip pressing means in pair are provided to press the outer lateral sides of the opposite seal lip members with a gap L between them being as given below:

$$2(t - \delta) < L < 2t$$

where t is the thickness of each seal lip member and δ is the elastic deformation of each seal lip member.

3. The scale device as set forth in claim 1, wherein the seal lip pressing means in pair are provided to press the outer lateral sides of the opposite seal lip members with a gap L between them being as given below:

$$2(t - \delta) < L < C \cdot \tan\theta + 2t$$

where t is the thickness of each seal lip member, δ is the elastic deformation of each seal lip member, C is a position of the pressed point from the end of the seal lip member, and θ is the opening angle between the pair of seal lip members.

4. The scale device as set forth in claim 1, wherein each of the seal lip members is formed from a low-friction, abrasion-resistant material.

5. The scale device as set forth in claim 1, wherein:

each of the seal lip members is a convex portion formed integrally on the carrier unit; and

a slit parallel to the seal lip member is formed in the base end of each convex portion to make the carrier unit flexible in the pressing direction of the seal lip

member.

6. The scale device as set forth in claim 1, wherein each of the seal lip members is a roller bearing installed rotatably on the carrier unit.
7. The scale device as set forth in claim 1, wherein each of the seal lip members is an elastic piece cantilevered at one end thereof by the carrier unit and whose free end presses the outer lateral side of the seal lip member.
8. The scale device as set forth in claim 1, wherein there are formed on the lateral sides, respectively, of the case member and carrier unit, opposite to each other, holding portions which are engaged on each other to hold the case member and carrier unit combined with each other.